APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/345,238	06/30/1999	SCOTT SHAOBING CHEN	YO999-172	9988

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EXAMINER
HAN, QI

ART UNIT	PAPER NUMBER
2654	

DATE MAILED: 08/27/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 07-01)

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☐ Responsive to communication(s) filed on _____ .

2a) ☐ This action is **FINAL.**   2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) *1-35* is/are pending in the application.

   4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) *1-35* is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.

   Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.

   If approved, corrected drawings are required in reply to this Office action.

12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   a) ☐ All b) ☐ Some * c) ☐ None of:

   1. ☐ Certified copies of the priority documents have been received.

   2. ☐ Certified copies of the priority documents have been received in Application No. _____ .

   3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

   * See the attached detailed Office action for a list of the certified copies not received.

14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

   a) ☐ The translation of the foreign language provisional application has been received.

15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>4</u> .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____ .

DETAILED ACTION

Information Disclosure Statement

1.   The references listed in the Information Disclosure Statement submitted on 10/13/2000

have been considered by the examiner (see attached PTO-1449).

Specification

2.   Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

The abstract has more than 150 words. Appropriate reduction in length of the abstract is

required.

3.   The disclosure is objected to because of the following informalities:

a) On page 24, line 14, "andthe" appears to be "and the". Appropriate correction is

required.

b) On page 2, line 9, "homogeneous segments" is not clearly defined. Appropriate

correction is required.

c) On page 2, line 22, "a single full covariance Guassian" is not clearly defined or

explained. Appropriate correction is required.

e) On page 3, Equation label is needed. Appropriate correction is required.

d) In the specification, many symbols or parameters ~~is~~ lack ~~of~~ explanation or antecedent

reference or proper range for enabling, for example, parameters λ and d in top line equation of

page 2, p, R^d and k_j in lines 23-25 of page 6, r, α and α_{max} in lines 13-15 of page 9. Also,

backward reference without notation is not appropriate way for the reference in the patent

publication. Appropriate correction is required.

Drawings

4.   The drawings are objected to because:

a) In Figs. 2, 3 and 4, the top block in each of the drawings is a title or notation of the

flow chart, but not as a part of its self. Appropriate correction is required.

b) In Figs. 4, block number 400 should be underlined. Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the

basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5.   Claims 1-5, 8, 10-14, 16-19, 21-26 and 28-35 are rejected under 35 U.S.C. 102(b) as

being anticipated by Chen et al. ("speaker, Environment and Channel Change Detection and

Cluster via the Bayesian Information Criterion," proceedings of the DARPA broadcast news

transcription and understanding workshop, Lansdowne, VA, Feb 8-11, 1998) hereinafter

referenced as Chen.

Regarding **claim 1**, Chen discloses speaker, Environment and Channel Change Detection

and Cluster via the Bayesian Information Criterion for segmenting the audio stream into

homogeneous region according to speaker identity, environmental condition and channel condition and clustering speech segments into homogeneous clusters according to speaker identity, environmental condition and channel (page 1, paragraph 2), which is read on the claimed "a method of tracking a speaker in an audio source, said method comprising the steps of: identifying potential segment boundaries in said audio source; and clustering homogeneous segments from said audio source substantially concurrently with said identifying step."

Regarding **claim 2**, Chen discloses everything claimed, as applied above (see claim 1). Chen further discloses that decision for detecting changes in speaker identity is based on the Bayesian Information Criterion (BIC) (page 2, paragraph 4), which is read on the claimed" wherein said identifying step identifies segment boundaries using a BIC model-selection criterion."

Regarding **claim 3**, Chen discloses everything claimed, as applied above (see claim 2). Chen further assumes that the sequence of cepstral vectors is draw from an independent multivariate Gaussian process and there is at most one changing point in the Gaussian process (page 3, paragraphs 4-5), and discloses that the hypothesis testing is view as a problem of model selection from two models: one models the data as two Gaussians; the other models the data as just one Gaussian (page 4, paragraph 2), which is read on the claimed "wherein a first model assumes there is no boundary in a portion of said audio source and a second model assumes there is a boundary in said portion of said audio source."

Regarding **claim 4**, Chen discloses everything claimed, as applied above (see claim 2). Chen further discloses a combination of two equations: the maximum likelihood ratio (page 3,

equation (2)) and the difference between the BIC values of the two models (page 4, equation (3)), which is inherently equivalent to the equation as claimed.

Regarding **claim 5**, Chen discloses everything claimed, as applied above (see claim 1). Chen further discloses that an algorithm sequentially detect the changing points in the Gaussian process and suggests that the algorithm starts with a small window and then extends the window size in each detecting loop (page 6, paragraph 1). It is also inherently true that the smaller the window size, the more unlikely the segment boundary occurs. This is read on the claimed "identifying step considers a smaller window size, n, of samples in areas where a segment boundary is unlikely to occur."

Regarding **claim 8**, Chen discloses everything claimed, as applied above (see claim 2). Chen further suggests not to use the change point detected in new process window (page 6, paragraph 1), which is read on the claimed "BIC model selection test is not performed at the border of each window of samples."

Regarding **claim 10**, Chen discloses everything claimed, as applied above (see claim 1). Chen further discloses to apply the BIC criterion in clustering (page 8, paragraph 2), which is read on the claimed "clustering step is performed using a BIC model-selection criterion."

Regarding **claim 11**, Chen discloses everything claimed, as applied above (see claim 10). Chen further discloses that in the hierarchical clustering two nodes can be merged only if the merging increases the BIC value (abstract, also see page 9, paragraph 3) that suggests the two models used in identifying step are also applied in clustering step, which is read on the claimed "wherein a first model assumes that two segments or clusters should be merged, and a second model assumes that said two segments or clusters should be maintained independently."

Regarding **claim 12**, Chen discloses everything claimed, as applied above (see claim 11).

Chen further discloses that the two nodes should not merger if an equation (8) (page 9,

paragraph 4) is negative, which is read on the claimed "merging said two clusters if a difference

in BIC values for each of said models is positive."

Regarding **claim 13**, Chen discloses everything claimed, as applied above (see claim 1).

Chen further discloses that using M segments and k clusters (page 8, paragraphs 2 and 3)

successively merge two nearest nodes in clustering step and generate a new cluster set S' from

pervious set S (page 9, paragraph 3), which is read on the claimed "clustering step is performed

using K previously identified clusters and M segments to be clustered."

Regarding **claim 14**, Chen discloses everything claimed, as applied above (see claim 1).

Chen further suggests to assign s as an identifier for a new cluster from two previous nodes or

clusters s1 and s2 after each merging (page 9, paragraph 3), which is read on the claimed "the

step of assigning a cluster identifier to each of said clusters." In addition, it is inherently true

that an index of data structure employed for clustering task can be always used as a cluster

identifier in software and/or firmware based process.

Regarding **claim 16**, the rejection bases on the same reason as applied above (see claim

1) because Chen discloses the same method for both "segments from said audio source

corresponding to the same speaker" and "homogeneous segments". In addition, the applicant

points out that "humongous segments" are "generally corresponding to the same speaker"

(abstract).

Regarding **claim 17**, Chen discloses everything claimed, as applied above (see claim 16).

Chen further discloses that decision for detecting changes in speaker identity is based on the

Bayesian Information Criterion (BIC) (page 2, paragraph 4), which is read on the claimed "wherein said identifying step identifies segment boundaries using a BIC model-selection criterion."

Regarding **claim 18**, Chen discloses everything claimed, as applied above (see claim 17). Chen further assumes that the sequence of cepstral vectors is draw from an independent multivariate Gaussian process and there is at most one changing point in the Gaussian process (page 3, paragraphs 4-5), and discloses that the hypothesis testing is view as a problem of model selection from two models: one models the data as two Gaussians; the other models the data as just one Gaussian (page 4, paragraph 2), which is read on the claimed "wherein a first model assumes there is no boundary in a portion of said audio source and a second model assumes there is a boundary in said portion of said audio source."

Regarding **claim 19**, Chen discloses everything claimed, as applied above (see claim 16). Chen further discloses that an algorithm sequentially detect the changing points in the Gaussian process and suggests that the algorithm starts with a small window and then extends the window size in each detecting loop (page 6, paragraph 1). It is also inherently true that the smaller the window size, the more unlikely the segment boundary occurs. This is read on the claimed "identifying step considers a smaller window size, n, of samples in areas where a segment boundary is unlikely to occur."

Regarding **claim 21**, Chen discloses everything claimed, as applied above (see claim 16). Chen further discloses to apply the BIC criterion in clustering (page 8, paragraph 2). Moreover, Chen discloses that in the hierarchical clustering two nodes can be merged only if the merging increases the BIC value (abstract, also see page 9, paragraph 3) that suggests the two models

used in identifying step are also applied in clustering step, which is read on the claimed

"clustering step is performed using a BIC model-selection criterion, where a first model assumes

that two segments or clusters should be merged, and a second model assumes that said two

segments or clusters should be maintained independently."

Regarding **claim 22**, Chen discloses everything claimed, as applied above (see claim 16).

Chen further discloses that using M segments and k clusters (page 8, paragraphs 2 and 3)

successively merge two nearest nodes in clustering step and generate a new cluster set S' from

pervious set S (page 9, paragraph 3), which is read on the claimed "clustering step is performed

using K previously identified clusters and M segments to be clustered."

Regarding **claim 23**, the rejection bases on the same reason as applied above (see claim

16) because the same method in Chen's disclosure can also be applied for claim 23 "the steps of:

identifying potential segment boundaries during a pass through said audio source; and clustering

segments from said audio source corresponding to the same speaker."

Regarding **claim 24**, Chen discloses everything claimed, as applied above (see claim 23).

Chen further discloses that decision for detecting changes in speaker identity is based on the

Bayesian Information Criterion (BIC) (page 2, paragraph 4), which is read on the claimed "said

identifying step identifies segment boundaries using a BIC model-selection criterion."

Regarding **claim 25**, Chen discloses everything claimed, as applied above (see claim 24).

Chen further assumes that the sequence of cepstral vectors is draw from an independent

multivariate Gaussian process and there is at most one changing point in the Gaussian process

(page 3, paragraphs 4-5), and discloses that the hypothesis testing is view as a problem of model

selection from two models: one models the data as two Gaussians; the other models the data as

just one Gaussian (page 4, paragraph 2), which is read on the claimed "wherein a first model assumes there is no boundary in a portion of said audio source and a second model assumes there is a boundary in said portion of said audio source."

Regarding **claim 26**, Chen discloses everything claimed, as applied above (see claim 23). Chen further discloses that an algorithm sequentially detect the changing points in the Gaussian process and suggests that the algorithm starts with a small window and then extends the window size in each detecting loop (page 6, paragraph 1). It is also inherently true that the smaller the window size, the more unlikely the segment boundary occurs. This is read on the claimed "identifying step considers a smaller window size, n, of samples in areas where a segment boundary is unlikely to occur."

Regarding **claim 28**, Chen discloses everything claimed, as applied above (see claim 23). Chen further discloses to apply the BIC criterion in clustering (page 8, paragraph 2). Moreover, Chen discloses that in the hierarchical clustering two nodes can be merged only if the merging increases the BIC value (abstract, also see page 9, paragraph 3) that suggests the two models used in identifying step are also applied in clustering step, which is read on the claimed "clustering step is performed using a BIC model-selection criterion, where a first model assumes that two segments or clusters should be merged, and a second model assumes that said two segments or clusters should be maintained independently."

Regarding **claim 29**, Chen discloses everything claimed, as applied above (see claim 23). Chen further discloses that using M segments and k clusters (page 8, paragraphs 2 and 3) successively merge two nearest nodes in clustering step and generate a new cluster set S' from

pervious set S (page 9, paragraph 3), which is read on the claimed "clustering step is performed

using K previously identified clusters and M segments to be clustered."

Regarding **claim 30**, it discloses an apparatus, which corresponds to the method of claim

1; the apparatus is inherent in that it simply provides structure for the functionality found in

claim 1.

Regarding **claim 31**, it discloses an article of manufacture, which corresponds to the

method of claim 1; the article of manufacture is inherent in that it simply provides structure and

implementation for the functionality found in claim 1.

Regarding **claim 32**, it discloses an apparatus, which corresponds to the method of claim

16; the apparatus is inherent in that it simply provides structure for the functionality found in

claim 16.

Regarding **claim 33**, it discloses an article of manufacture, which corresponds to the

method of claim 16; the article of manufacture is inherent in that it simply provides structure and

implementation for the functionality found in claim 16.

Regarding **claim 34**, it discloses an apparatus, which corresponds to the method of claim

23; the apparatus is inherent in that it simply provides structure for the functionality found in

claim 23.

Regarding **claim 35**, it discloses an article of manufacture, which corresponds to the

method of claim 23; the article of manufacture is inherent in that it simply provides structure and

implementation for the functionality found in claim 23.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6.   Claims 6-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen in view

of well known prior art (MPEP 2144.03).

Regarding **claim 6**, Chen discloses everything claimed, as applied above (see claim 5).

Chen further cites that by expanding the window, the final decision of a change point is made

based on as much data points as possible (page 6, paragraph 2). But, Chen fails to specifically

disclose to increase small window size in slow manner and increase larger window size in a

faster manner. However, the examiner takes official notice of the fact that it was well known in

the art to adjust increase rate based on data size processed.

Therefore, it would have been obvious to one of ordinary skill in the art at time the

invention was made to modify Chen by specifically providing an adjustable increase rate base on

processed window size, for the purpose of reducing processing time.

Regarding **claim 7**, Chen and well-known prior art disclose everything claimed, as

applied above (see claim 6). Chen further discloses that the window size [a=t+1, b=a+1]=1 is

reinitialized after detecting a segment boundary (page 6, paragraph 1), which is read on the

claimed "window size, n, is initialized to a minimum value after a segment boundary is

detected."

Regarding **claim 9**, Chen discloses everything claimed, as applied above (see claim 2).

But, Chen fails to specifically disclose that "BIC model selection test is not performed when the

window size, n, exceeds a predefined threshold." However, the examiner takes official notice of

the fact that it was well known in the art to stop a process when it exceeds a predefined

threshold.

Therefore, it would have been obvious to one of ordinary skill in the art at time the

invention was made to modify Chen by specifically providing a predefined threshold and a test

condition for the purpose of preventing a process from over sizing.

Regarding **claim 20**, Chen discloses everything claimed, as applied above (see claim 17).

But, Chen fails to specifically disclose that "wherein said BIC model selection test is not

performed where the detection of a boundary is unlikely to occur." However, the examiner takes

official notice of the fact that it was well known in the art to skip certain portion of data for

processing, because the portion has very small chance to be hit.

Therefore, it would have been obvious to one of ordinary skill in the art at time the

invention was made to modify Chen by specifically providing a skipping mechanism for those

data that unlikely have a boundary for detection, for the purpose of increasing efficiency and

reducing processing time.

Regarding **claim 27**, Chen discloses everything claimed, as applied above (see claim 26).

But, Chen fails to specifically disclose that "wherein said BIC model selection test is not

performed where the detection of a boundary is unlikely to occur." However, the examiner takes

official notice of the fact that it was well known in the art to skip certain portion of data for

processing, because the portion has very small chance to be hit.

Therefore, it would have been obvious to one of ordinary skill in the art at time the

invention was made to modify Chen by specifically providing a skipping mechanism for those

data that unlikely have a boundary for detection, for the purpose of increasing efficiency and

reducing processing time.

7.   Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chen in view of

Kleider et al. (USPN 5,157,763), hereinafter referenced as Kleider.

Regarding **claim 15**, Chen discloses everything claimed, as applied above (see claim 1).

But, Chen fails to specifically disclose "processing said audio source with a speaker

identification engine to assign a speaker name to each of said cluster." However, the examiner

contends that the concept of providing an identified speaker cluster with a speaker name was

well known, as taught by Kleider.

In the same field of endeavor, Kleider discloses a speaker identification system and

method. Kleider employs a speaker identification metric (226) (Fig. 2) in that each element is

associated with one particular speaker in the speaker model data 213 (Fig. 2) (column 6, lines

25-32). Kleider further suggests that the information of the speaker model data may include

speaker name (column 6, line 44).

Therefore, it would have been obvious to one of ordinary skill in the art at time the

invention was made to modify Chen by specifically providing a speaker identification

mechanism to associate a speaker cluster identifier with a speaker name, as taught by Kleider, for

the purpose of using a common identifier in a speaker identification system.

Conclusion

8.   Any response to this office action should be mailed to:
            Commissioner of Patents and Trademarks,Washington D.C. 20231
        or faxed to:
            (703)-872-9314
        Hand-delivered responses should be brought to:
            Crystal Park II, 2121 Crystal Drive, Arlington. VA. Sixth Floor (Receptionist).

        Any inquiry concerning this communication or earlier communications from the
examiner should be directed to Qi Han whose telephone numbers is (703) 305-5631. The
examiner can normally be reached on Monday through Thursday from 8:00 a.m. to 5:30 p.m. and
Friday from 8:00 a.m. to 12:00 a.m.

        If attempts to reach the examiner by telephone are unsuccessful, the examiner's
supervisor, Marsha Banks-Harold, can be reached on (703) 305-4379.

        Any inquiry of a general nature of relating to the status of this application or proceeding
 should be directed to the Technology Center 2600 Customer Service Office whose telephone
number is (703) 306-0377.

QH/qh   *Marsha D Banks-Harold*
August 1, 2002   MARSHA D. BANKS-HAROLD
                                        SUPERVISORY PATENT EXAMINER
                                        TECHNOLOGY CENTER 2600